OAK RIDGE National Laboratory

Display Builder Web Runtime

https://github.com/kasemir/pvws

https://github.com/kasemir/dbwr

Kay Kasemir, June 2019

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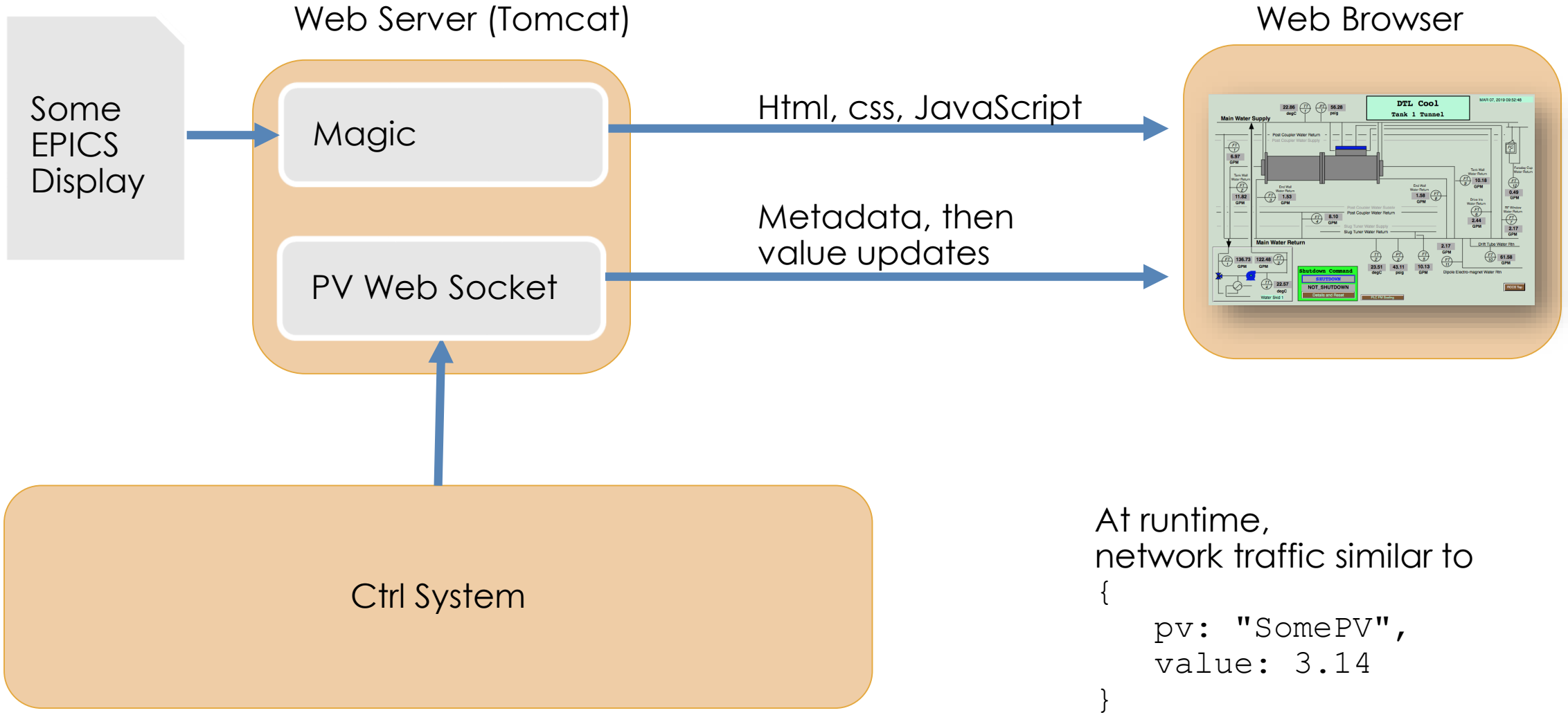
U.S. DEPARTMENT OF ENERGY

General Web Display Idea



At runtime,
network traffic similar to

```
{
    pv: "SomePV",
    value: 3.14
}
```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EPICS Operator Interfaces

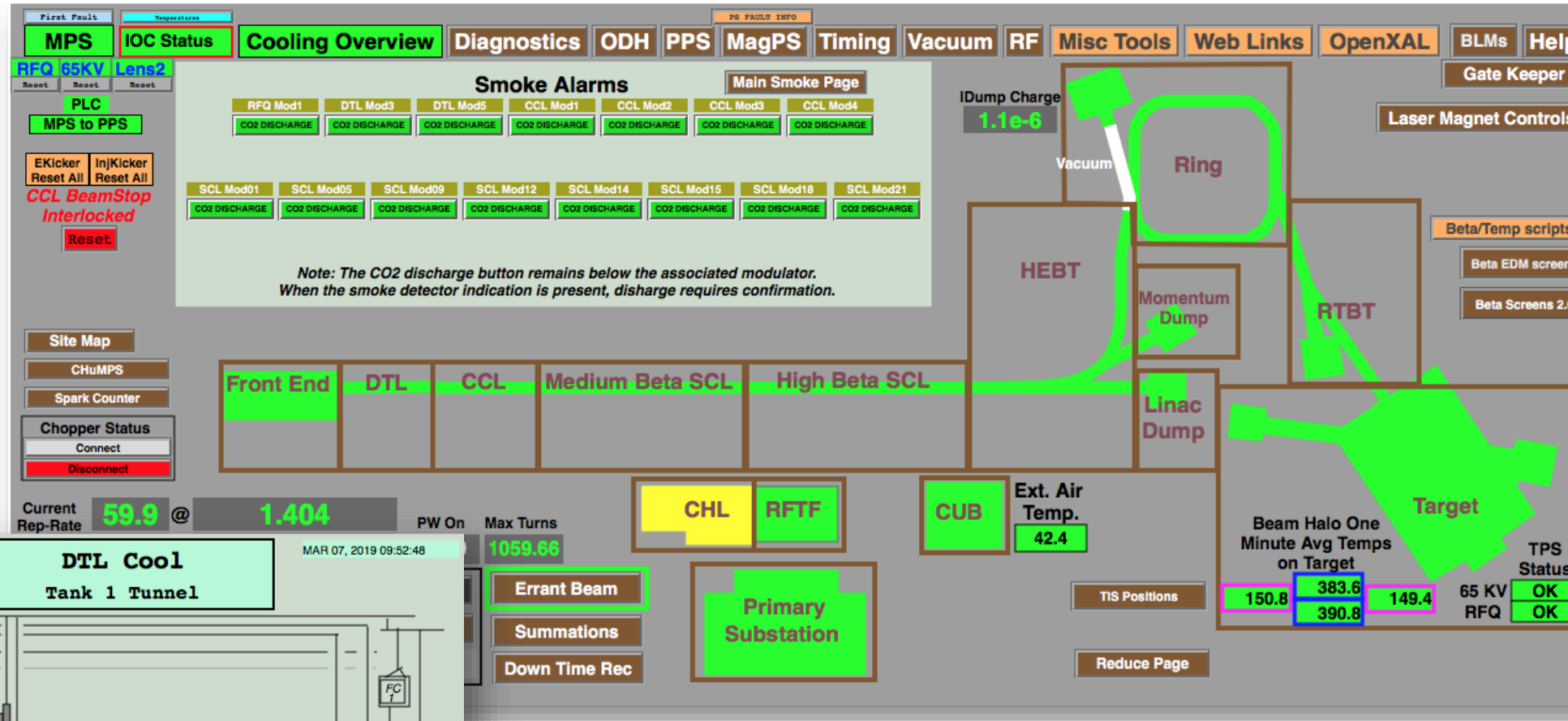
198x	edd/dm	X11, *Xt*
199x	medm, dm2k	*Motif*
200x	edm	*Motif*
2010	CS-Studio BOY	*SWT*
2017	CS-Studio Display Builder	*JavaFX*
Also:	tcl/tk/ca, python/qt/ca, ..	*TK* *Qt*

UI libs change with technology and fashion

Web EDM

Ryan Slominski,
JLab,

2017 EPICS Meeting



Very useful and performant for EDM displays and Channel Access IOCs

Limitations:

- No waveforms (plots, images)
- No metadata from non-IOC servers (LabView, Python)
- No PV Access support

PV Web Socket - https://github.com/kasemir/pvws

- Based on Phoebus Stack
  - VType PV for loc://, sim://, ca://, pva://, …
  - PV Pooling
  - RXJava Throttling
- Data Packaged as JSON
  - Sends metadata once
    - No separate connections to *.EGU, *.PREC, …
  - Severity and value on change
  - Arrays packed as Base64-binary
  - JavaScript in client merges updates

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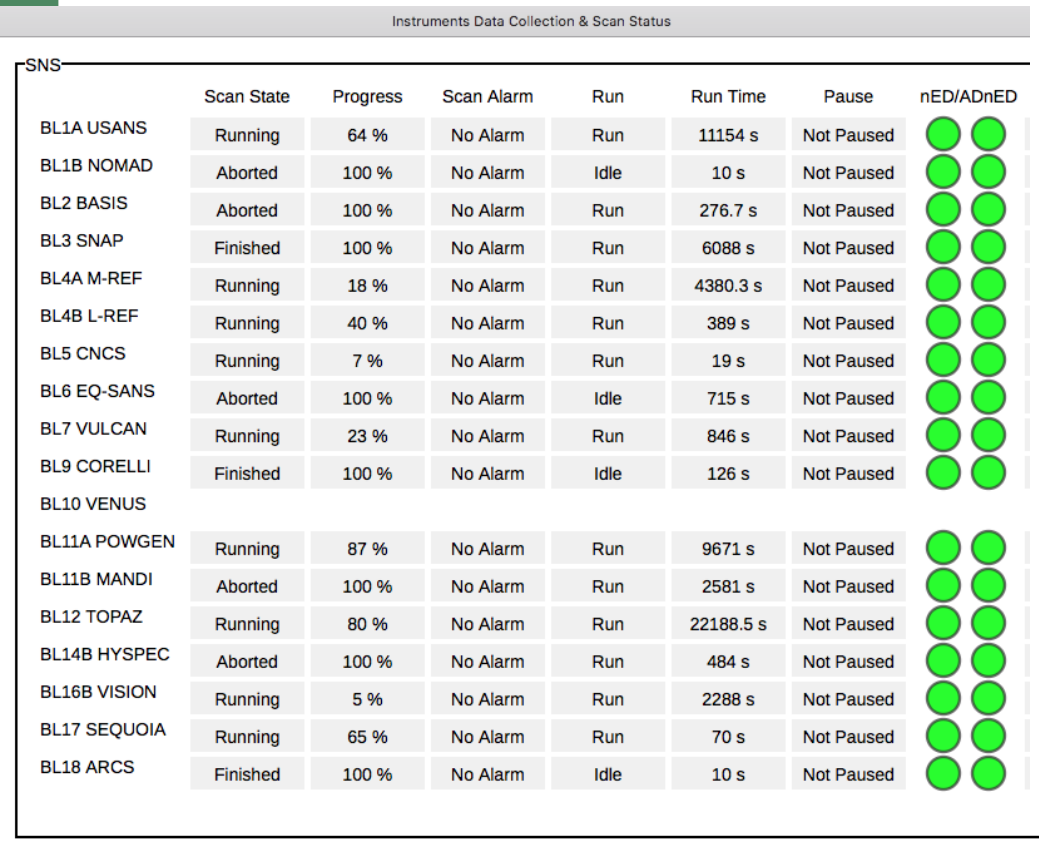
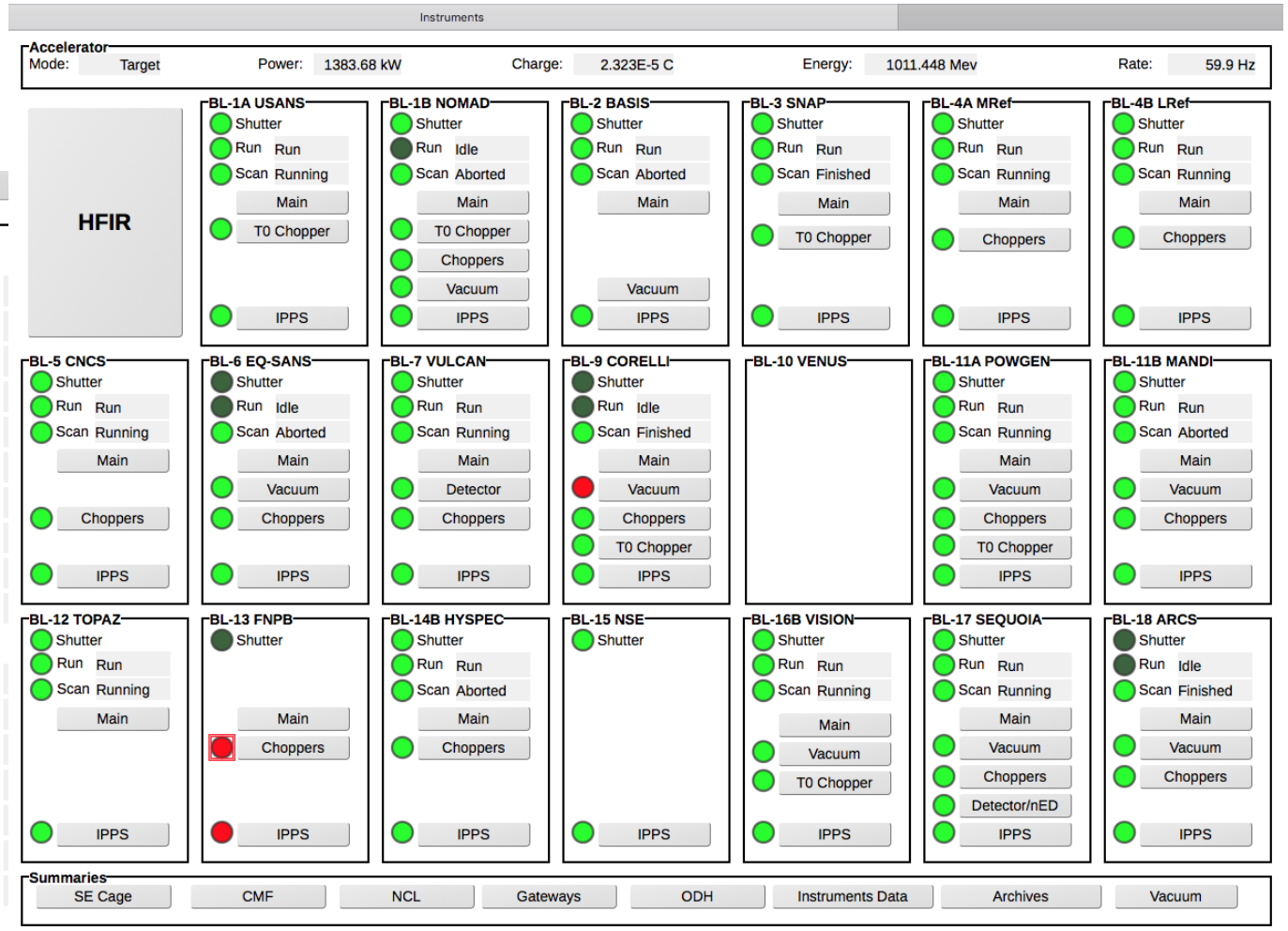
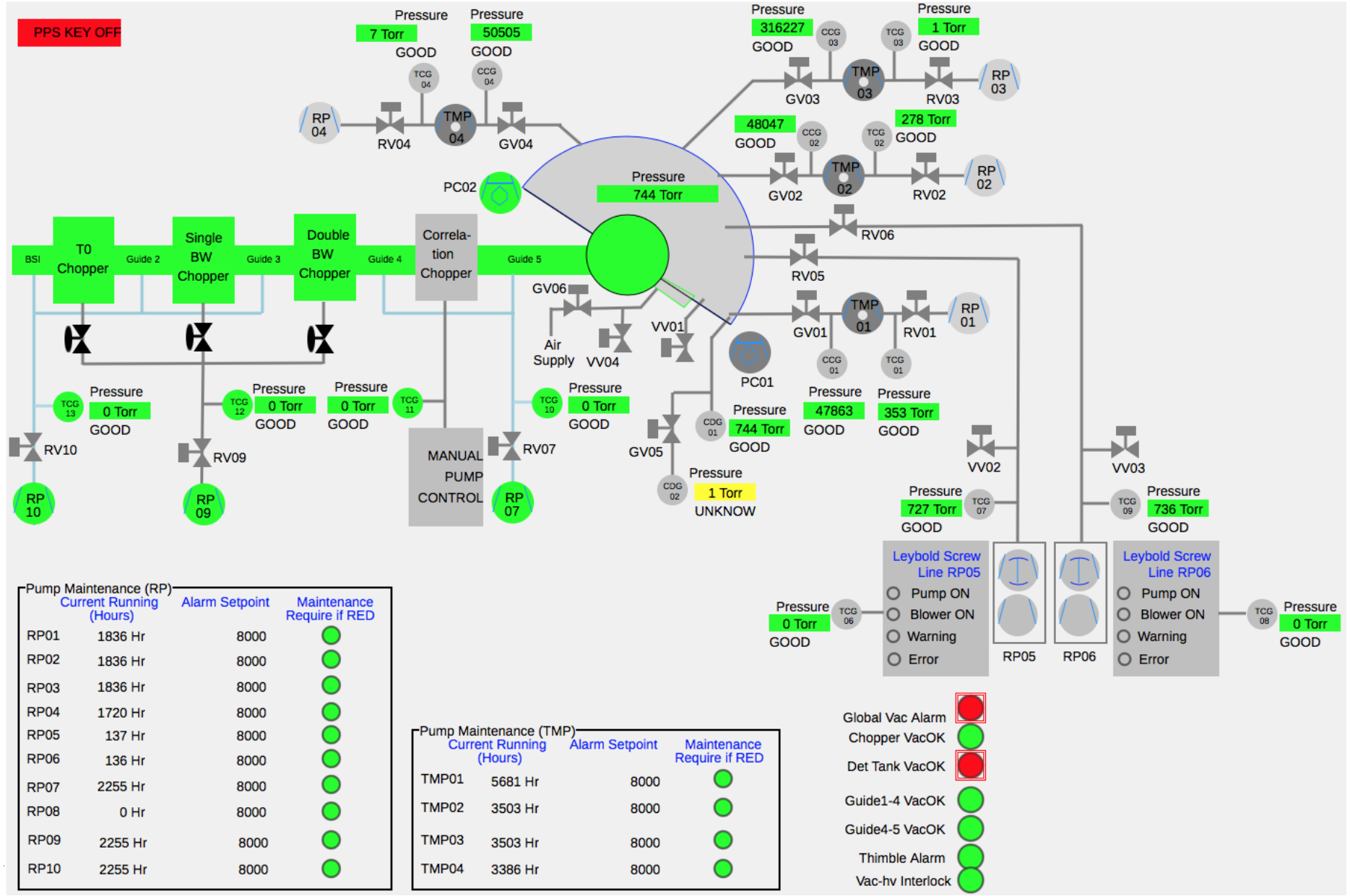
Display Builder Web Runtime - https://github.com/kasemir/dbwr





Labels, LEDs, Text Updates
Groups, Embedded displays, Macros

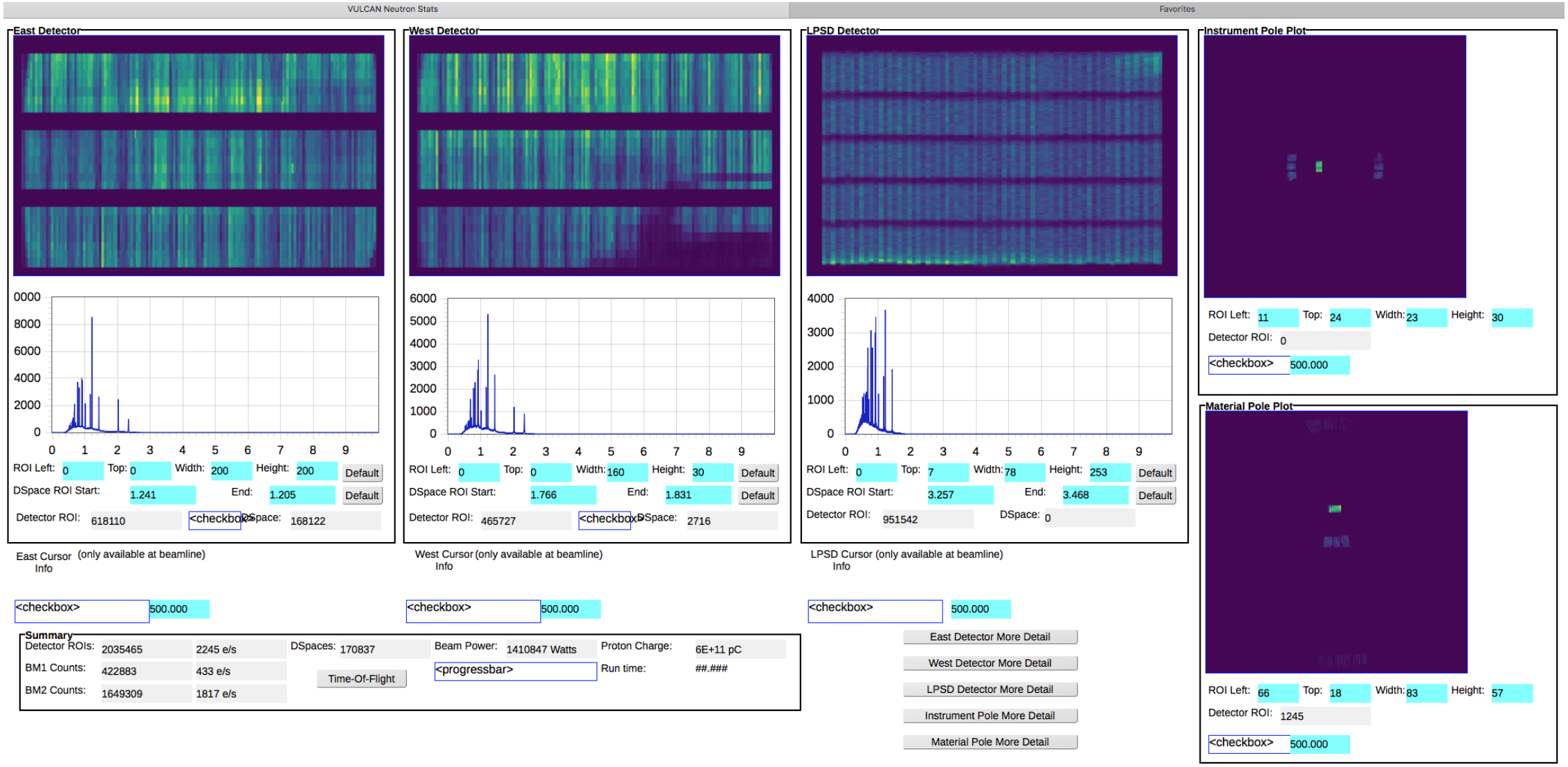
'Static' Widgets



Lines,
Circles,
Rectangles, ..

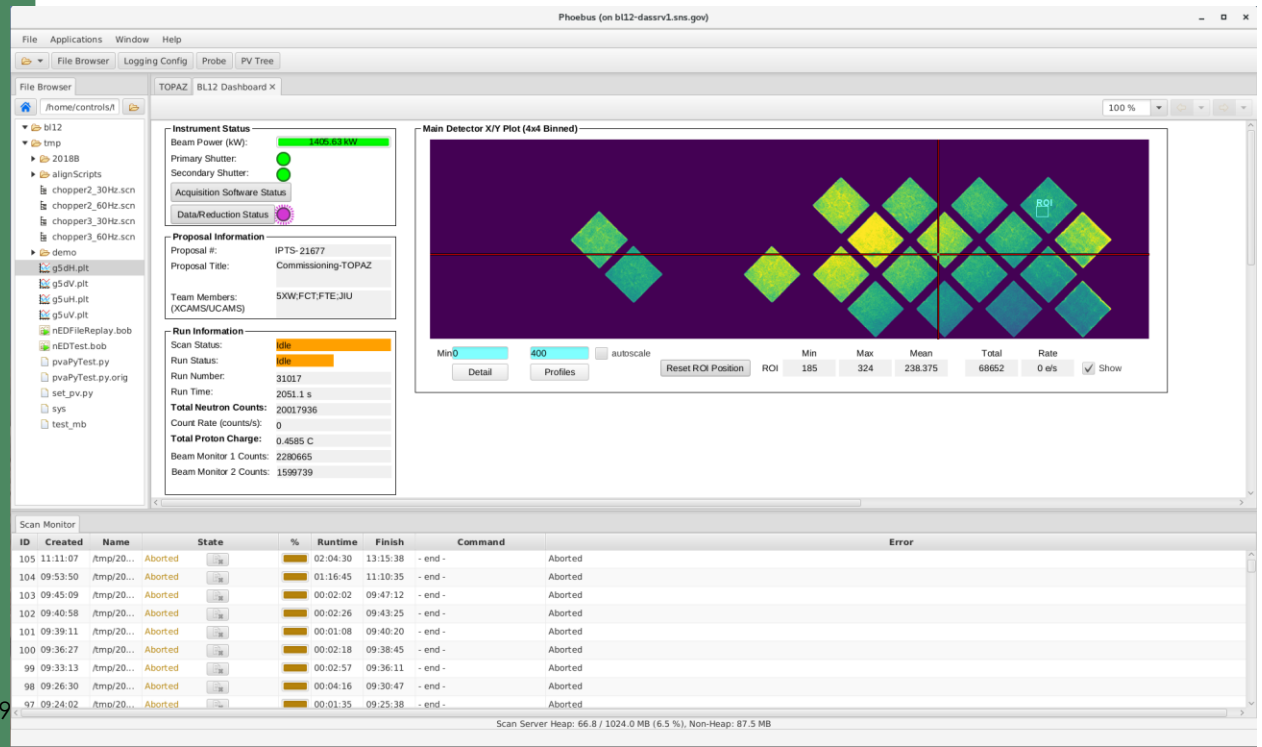
Limited 'Rule' Support:
Some colors,
Hide/Show

Line and Detector plots



CS-Studio on Desktop vs. Web Runtime

- Integrated Product
- Robust Development
  - Type checking
  - Single-Language



- Just Display Runtime
- Fragile Development
  - No type checking
  - Client: HTML, CSS, JS
    Server: Java, Python, …
  - Different Web Browsers

Still:
Read-only web view of control system is extremely convenient and useful!

Status: New Project, but already very useful

- Label
- Rectangle
- Ellipse
- Arc
- Polyline
- Polygon
- Text Update
- Text Input
- Text formatting (precision, units, enum labels)
- LED
- Multi-State LED
- Action Button to open display or web link
- Combo
- Group with group border
- Embedded Displays
- Tabs
- XYPlot
- Image
- Macro support
- Alarm-sensitive border based on PV
- Limited Rule support: Color of rect/circle/label, visibility
- Caching

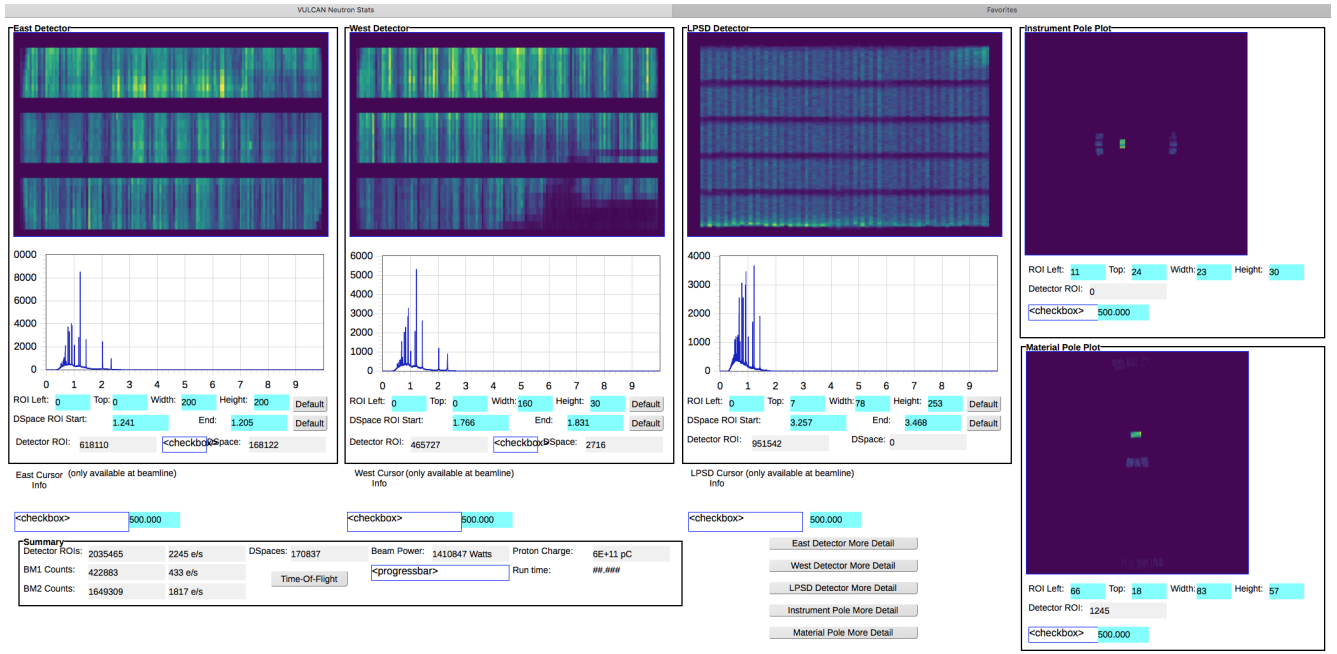
Summary

Display Builder *Web Runtime* offers web access to much of the *Desktop* version

https://github.com/kasemir/pvws
https://github.com/kasemir/dbwr

1. git clone
2. ant
3. copy *.war to Tomcat
4. Set environment:
   EPICS_CA_ADDR_LIST, ..

➔ http://your_tomcat/dbwr



Limited Compatibility

MEDM

```
Text
{
  object
  {
    x= 265
    y= 440
    width=155
    height=20
  }
  "basic attribute”
  {
    clr=54
  }
  textix=”Hello"
}
```

EDM

```
object activeXTextClass
beginObjectProperties
x 265
y 440
w 155
h 20
font "arial-bold-r-10.0"
fgColor index 5
value {
  ”Hello"
}
endObjectProperties
```

Dump of tool’s in-memory “model”.

Qt Designer

```
<widget class="caLabel" name="caLabel_0">
  <property name="foreground">
    <color alpha="255">
      <red>10</red>
      <green>0</green>
      <blue>184</blue>
    </color>
  </property>
  <property name="text">
    <string>Hello</string>
  </property>
  <property name="geometry">
    <rect>
      <x>265</x>
      <y>440</y>
      <width>155</width>
      <height>20</height>
    </rect>
  </property>
</widget>
```

Why not just <text>Hello?

Simple, General Format

Display Builder

```
<widget type="label">
  <x>268</x>
  <y>440</y>
  <width>155</width>
  <height>20</height>
  <text>Hello<text>
  <foreground_color>
    <color red="0" green="0" blue="0”/>
  </foreground_color>
</widget>
```

- XML
  - Somewhat human-readable
  - Parsers for every programming language
- “label”, “text_update”
  - Not hinting at specific implementation